

Appl. No.: 10/087,485
Amdt. Dated: July 14, 2003
Reply to Office Action of: October 13, 2003

Attorney Docket No. SP01-033A

The listing of claims will replace all prior versions, and listings, of claims in the application:

1. Listing of Claims:

A1
Claim 1-12, 14, 16-17, 20-26, 28, 32, 33-40, and 45-50. *Cancelled herein*

13. (Amended) A laser system as claimed in claim 15 ~~4~~ wherein said magnesium fluoride crystal optic window has a 200 to 210 nm range absorption coefficient $< 0.0017 \text{ cm}^{-1}$.

A2
15. (Amended) A ≥ 4 kHz repetition rate fluoride excimer laser system for producing an UV wavelength $\lambda < 200\text{nm}$ output, said laser system comprising:
an excimer laser chamber, ~~said excimer laser chamber~~ for producing an UV wavelength $\lambda < 200\text{nm}$ discharge at a pulse repetition rate ≥ 4 kHz,
wherein said excimer laser chamber includes including at least one magnesium fluoride crystal optic window for outputting said $\lambda < 200\text{nm}$ discharge as a ≥ 4 kHz repetition rate excimer laser $\lambda < 200\text{nm}$ output; said magnesium fluoride crystal optic window having a 255nm induced absorption less than $0.08 \text{ Abs}/42\text{mm}$ when exposed to 5 million pulses of 193nm light at a fluence $\geq 40 \text{ mJ}/\text{cm}^2/\text{pulse}$, $40\text{mJ}/\text{cm}^2/\text{pulse}$ and a 42mm crystal 120nm transmission of at least 30% and a 200 to 210 nm range absorption coefficient $< 0.0017 \text{ cm}^{-1}$
optic window

18. (Original) A laser system as claimed in claim 15 wherein said 42mm crystal 120nm transmission is at least 40% .

A3
19. (Amended) A laser system as claimed in claim 15, wherein said magnesium fluoride crystal optic window and/or prism has, by weight, has a an Fe contamination level less than 0.15ppm, Fe by weight a Cr contamination level less than 0.08 ppm, a Cu contamination level less than 0.04 ppm, a Co contamination level less than 0.04ppm, an A:

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contamination level less than 0.9 ppm, a Ni contamination level less than 0.4 ppm, a V
contamination level less than 0.04 ppm, and a Pb contamination level less than 0.04 ppm.

27. (Amended) A laser system as claimed in claim 15 wherein said laser system includes further comprises:

a magnesium fluoride crystal optic prism, said magnesium fluoride crystal optic prism being external from said excimer laser chamber, wherein said ≥ 4 kHz repetition rate excimer laser $\lambda < 200$ nm output is transmitted through said magnesium fluoride crystal optic prism and with said magnesium fluoride crystal optic prism having a 255nm induced absorption less than 0.08 Abs/42mm when exposed to 5 million pulses of 193nm light at a fluence ≥ 40 mJ/cm²/pulse, and a 42mm crystal 120nm transmission of at least 30%.

29. (Original) A laser system as claimed in claim 27 wherein said magnesium fluoride crystal optic prism has an 200 to 210 nm range absorption coefficient < 0.0017 cm⁻¹.

30. (Amended) A ≥ 4 kHz repetition rate fluoride excimer laser crystal optic for transmitting a ≥ 4 kHz repetition rate fluoride excimer UV wavelength $\lambda < 200$ nm output, said laser crystal optic comprising:

MF crystal 255nm a magnesium fluoride crystal with a 255nm induced absorption less than 0.08 Abs/42mm when exposed to 5 million pulses of 193nm light at a fluence ≥ 40 mJ/cm²/pulse 42mm crystal 40mJ/cm²/pulse and a 42mm crystal 120nm transmission of at least 30%; and
said crystal optic has a 200 to 210 nm range absorption coefficient < 0.0017 cm⁻¹.

31. (Original) A ≥ 4 kHz repetition rate fluoride excimer laser crystal optic as claimed in 30 wherein λ is centered about 193nm.

33. (Amended) A ≥ 4 kHz repetition rate fluoride excimer laser crystal optic as claimed in 30 wherein said magnesium fluoride crystal has, by weight, an a Fe contamination level less than .15ppm, Fe by weight a Cr contamination level less than 0.06 ppm, a Cu contamination level less than 0.02 ppm, a Co contamination level less than 0.02ppm, an Al

MF crystal

Fe

Cu

Co

Al

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contamination level less than 0.7 ppm, a Ni contamination level less than 0.2 ppm, a V
contamination level less than 0.02 ppm, and a Pb contamination level less than 0.02 ppm.

41. (Original) A \geq 4 kHz repetition rate fluoride excimer laser crystal optic as claimed in 30 wherein said magnesium fluoride crystal optic has a flat planar face oriented normal to a c axis of said magnesium fluoride crystal.

42. (Amended) A \geq 4 kHz repetition rate fluoride excimer laser crystal optic as claimed in 30 wherein said magnesium fluoride crystal optic has a flat planar face oriented non-normal nearnormal to a c axis of said magnesium fluoride crystal.

43. (Original) A \geq 4 kHz repetition rate fluoride excimer laser crystal optic as claimed in 30 wherein said magnesium fluoride crystal has a c axis grown magnesium fluoride crystallographic orientation.

51. (New) The laser system according to claim 15, wherein said laser system is an argon fluoride laser system.

52. (New) The excimer laser optic as claimed in claim 30, wherein said optic is in the form of a laser window or prism.